Original Article

Internet Addiction and Interpersonal Communication Skills Among High School Students in Tabriz, Iran

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Abstract

Background: Adolescents' addiction to internet is a serious problem worldwide, especially in the developing countries.
Objectives: The current study aimed at estimating the prevalence of internet addiction (IA) and its relationship with interpersonal communication skills (ICS) and socio-educational factors among high school students in Tabriz, Northwest of Iran.
Methods: In the current cross sectional study, a total of 2416 students were selected as a study sample size in 2010. The data were collected using a valid and reliable self-administered questionnaire. The direct standardization method was employed to calculate IA prevalence.
Results: The prevalence of IA was 52.1% in males and 37.0% in females. The standardized prevalence of IA among the study sample was 45.8%. The results of logistic regression analysis suggested the association of the gender (odd ratios = 1.91) and ICS scores (OR = 0.97) with IA.
Conclusions: The prevalence of IA among adolescents in the Northwest of Iran was high. Males were at higher risk of IA than their female counterparts. Improvements of ICS may prevent IA in adolescents.

Keywords: Adolescent Health, High School, Internet Addiction, Interpersonal Communication Skills

1. Background

Internet addiction (IA) is usually regarded as a harmful and uncontrollable use of the Internet (1). Adolescents' addiction to internet is a serious problem worldwide, especially in the developing countries. Adolescents are more vulnerable to internet addiction than adults, and this addiction can affect their social performance, psychological status, and lifestyle (2-4).

Recently conducted studies examined the prevalence of IA in adolescents, and reported various data in different regions of the world. The prevalence of IA among adolescents is reported 22.5% in Hong Kong (5), 8.8% in China (6), 3.1% in Greece (7), about 15.1% in Turkey (8), and 34.9% at moderate and 4.2% at severe levels in Lebanon (9). In Iran, a study by Kheirkhah et al., showed that 22.8% of coffee net users, with the mean ± standard deviation (SD) age of 20.25 ± 4.19 years depended on internet (10). Another study in secondary and high school adolescents, with the age range of 14 to 19 years, revealed that 21.1% of the students were somehow victims of IA, among whom 1.1% had significant problematic symptoms (11). Ghassemzadeh et

al., in their study found that 3.7% and 31.1% of a sample of Iranian internet user adolescents were IAs and possible IAs, respectively (12).

Notwithstanding advantages of internet use, illogical, and overuse of this technology has some complications such as familial, academic, and occupational problems, which many practitioners and parents are unaware about its complications. In fact, addictive use of internet among adolescents is considered as a major concern for parents, educators, sociologists, psychiatrists, and psychologists due to its negative consequences such as failure to manage time, lack of sleep, untimely eating, and social isolation (2, 13-16). Therefore, further studies are required to determine the risk factors associated with IA to address the emerging phenomenon of IA disorder.

Previous studies in Iran showed that IA phenomenon is increasing among adolescents and parents concern about their children's excessive use of internet. Since a vast majority of adolescents are students, IA and spending several hours with computers, tablets, mobiles, or laptops preclude them from studying and learning. This, in turn, leads

to academic failure and less qualified graduates (10, 17).

There is growing popularity of the use of internet, especially among adolescents and students in Iran. Nevertheless, the issue of IA is the subject of a limited number of studies (10, 11).

2. Objectives

The current study first examined the prevalence of IA and its relationship with interpersonal communication skills (ICS), and then, investigated the factors predicting IA among adolescents in the Northwest of Iran. The results of the current study can be used as the baseline data on the epidemiology of IA, which can be useful for future comparison of secular trend in the prevalence of IA. Additionally, the results of the current study can provide useful insights on the predictors of IA that can be used by the authorities to identify at-risk groups and, therefore, design effective educational programs to prevent IA.

3. Materials and Methods

3.1. Study Design and Participants

The current study was based on a project conducted in November and December 2010 in Tabriz, Northwest Iran. To calculate the sample size, based on the study by Ahmadi and Saghafi (11), P value, α, and precision (d) were considered as 0.21, 0.05, and 0.02, respectively. Therefore, the study sample size calculated 1593 subjects. The following sampling method was applied to select study subjects. Ninety-eight classes were randomly and proportionally selected from 31 high schools as clusters by considering the gender of students, state or private school, number of students in each school, and students' educational major. Of the total number of students in the classes (2488), 79 (3.2%) students were absent on the day of intervention and 9 (0.36%) had no interest to cooperate with the study. Accordingly, a total number of 2416 students who completed a self-administered multiple-choice questionnaire were participated in the study. To enhance the validity of students' responses, they were assured about strict confidentiality of the responses and that they could not be identified based on their answers to the questionnaire. They were also informed about the voluntary nature of the participation in the study and the fact that they had the right to refuse or skip any questions.

3.2. Study Tool

A questionnaire was designed to collect information about the demographical and educational characteristics, and internet addiction and ICS of students in the study. The questionnaire was expected to be filled approximately in 15 to 20 minutes. Internet addiction was assessed by Persian version of the 20-item Young internet addiction test (YIAT) (18). The questions were scored using a 5-point Likert scale, ranging from 1 to 5. Hence, the test produced a potential range of 20 to 100; higher scores indicating a greater tendency toward addiction. Three types of internet user groups were defined: i) Users with complete control over his/her usage, 20 to 49 scores, ii) Users with frequent problems due to internet usage, 50 to 79 scores, and iii) Users severely influenced by internet, 80 to 100 scores. According to the results of the current and previously conducted studies (7), a score of $\geq$ 50 was considered as IA. Test-retest correlation of the Persian version of this measure in 71 high school students, with a 2-week interval, was 0.79 (Cronbach's alpha = 0.92). ICS was assessed by a Persian version of the 34-item Quondam communication skills test-revised recently adopted and used in Iran (19). The questions are scored using a 5-point Likert scale, ranging from 1 to 5 and some questions are reversely scored. This test produced a potential range of 34 to 170; higher scores indicating higher communication skills. Test-retest correlation of the Persian version of the measure in 71 high school students, with a 2-week interval, was 0.75 (Cronbach's alpha = 0.88).

3.3. Statistical Analysis

To account for the cluster sampling method used to identify students in the sample, survey analysis method was used to obtain 95% confidence intervals. Due to the difference between the number of students in different grades, students' gender, and the IA prevalence between the grades and gender, a direct standardized method was utilized to calculate IA prevalence for the whole sample. The Chi-square test and independent samples t test were used to examine the unadjusted association between related risk factors and IA in the univariate analysis. Moreover, a multivariate logistic regression was used to investigate the effect of predicting factors on IA among high school students.

The institutional review board (IRB) of Tabriz University of Medical Sciences approved the study protocol; the questionnaire and consent form were also reviewed and approved. The authors declared no conflict of interests.

4. Results

4.1. Sample Characteristics

A total of 2416 students participated in the current study, out of which 2318 (95.9%) completed the study questionnaire. The mean age of the students was 17.1 ± 2.0 years,

ranged from 14 to 19. The sample was relatively evenly distributed by gender, with 1061 (45.8%) males and 1257 (54.2%) females. While 403 (17.4%) students were in the 9th grades, the number of students in the 10th, 11th and 12th grades was 462 (20.0%), 1254 (54.2%), and 196 (8.5%), respectively. The mean of students' grade point average (GPA) was 16.3 ± 2.2 (median: 16.5).

4.2. Prevalence of IA

Table 1 shows the prevalence of IA by gender. As reported in the table, 22.5% and 2.1% of the students had IA scores of 50 to 79 and 80 to 100, respectively. The prevalence of IA was higher among the males compared to females. A significant number of students, 1073, had no internet exposure and they were excluded from the rest of the analyses. After considering IA as 50 or more and excluding none users, the prevalence of IA was 52.1 (95% CI: 48.2 - 55.9) in males and 37.0 (95% CI: 33.2 - 40.9) in females. The standardized prevalence ratio of IA for the entire sample was 45.8 (95% CI: 43.1 - 48.6).

4.3. IA and Socio-Educational Variables

The results of univariate analysis indicated that IA was significantly associated with male gender, grade, and educational major, followed by the former low GPA (see Table 2). The prevalence of IA was higher among males and lower grade students than the females and higher grade students. Students with low GPA were at higher risk for IA.

4.4. IA and Interpersonal Communication Skills

Internet addiction was associated with ICS. The mean scores of ICS in students with and without IA were 114.9 ± 11.1 and 118.4 ± 11.1, respectively (P value < 0.001). There was a negative correlation between the scores of IA and ICS (r = -0.17, P value < 0.001).

4.5. Predictors of IA

The results of logistic regression analysis indicated that the scores of gender (OR = 1.91, 95% CI: 1.51 - 2.41) and ICS (OR = 0.97, 95% CI: 0.96 - 0.98) were significantly associated with IA (see Table 3).

5. Discussion

The results of the current study showed that the prevalence of IA among adolescent internet users was 45.8% and IA was more prevalent among males than females. Based on the findings of the current study, the prevalence of IA among high school students in the Northwest of Iran was much more than the reported prevalence in the previous studies conducted in Iranian universities and high schools

(10-12, 20) and elsewhere in the world (5-9). It should be noted that the current study estimated the prevalence of IA only among internet users. The study calculated the prevalence of IA using direct standards adjusted to the cluster sampling method and infraclass correlation. Although the previous works in Iran showed that IA phenomenon increased among adolescents (10, 17), the study population, place of study, and sample size could explain the increasing trend in IA over time. Most of the previous studies on IA in Iran were conducted in university settings whereas the current study investigated IA among high school students and adolescents. However, it seems that more IA and tendency to computers, tablets, laptops, and cell phones among high school students could be due to more emotional behaviors and curiosity among adolescents.

Based on the results of previous studies, the prevalence of IA in universities was different from that of high schools (10, 11, 17, 21). It can be explained by the fact that when students enter universities other aspects of life become important; therefore decrease in IA is somehow expected in universities. More specifically, communicating with the opposite gender in Iranian universities is easier than high schools. On the other hand, the adolescents in Iran usually use internet to communicate with each other; therefore, the gender differences of IA in Iranian universities and high schools is expected.

The results of the current study univariate analysis suggested a statistically significant relationship between former GPA and IA; students with IA had lower GPA. A study by Bayraktar and Gun (22) showed that the students' GPA decreased when "pathological internet usage" increased. However, according to a previous study in Indian high school students (23), the academic performance was not a significant determinant of IA.

Severe and moderate internet addiction was higher in males than females. These findings were similar with those of some previous studies conducted in Iran and other studies worldwide (8, 10, 11, 24, 25). Also, according to the results of a study by Sipal et al., compared to females, males spend more time on internet (26). Overall, it is evident that gender influences IA. As females and males have different preferences in their internet activities, gender differences in IA may depend on the type of internet activity (9). Expectations from gender roles may also explain gender difference in internet use (27). Indeed, a study by Kennedy et al., reported different levels of internet use in male and female students even though the availability of the internet was identical for both genders (28). Unlike university students, several studies in Iran and elsewhere also showed that IA was more prevalent among males than their female counterparts (23, 29, 30). The findings of the current study were similar to the corresponding findings of other

Table 1. Prevalence of Internet Addiction by Gender

IA Score	Male, N (%)	Female, N (%)	Total, N (%)	Total Standardized Prevalence, % (95% CI)
Not use	416 (39.2)	657 (52.3)	1073 (46.3)	47.6 (45.6 - 49.6)
20 - 49	309 (29.1)	378 (30.1)	687 (29.6)	27.8 (26.0 - 29.6)
50 - 79	310 (29.2)	208 (16.5)	518 (22.3)	22.5 (20.9 - 24.3)
80 - 100	29 (2.5)	14 (1.1)	40 (1.7)	2.1 (1.5 - 2.7)
Total	1061 (45.8)	1257 (54.2)	2318 (100)	100 (-)

Table 2. The Results of the Univariate Analysis of the Relationship Between Socio-Educational Variables and Internet Addiction

Variables	With IA, N (%)	Without IA, N (%)	P Value
Total: 1245	558 (44.8)	687 (55.2)	
Gender			< 0.001
Male	336 (52.1)	309 (47.9)	
Female	222 (37.0)	378 (63.0)	
Grades			0.100
9th	82 (48.8)	86 (51.2)	
10th	134 (49.8)	135 (50.2)	
11th	306 (42.7)	410 (57.3)	
12th	36 (39.1)	56 (60.9)	
Education major			0.041
Mathematics and physics	108 (45.4)	130 (54.6)	
Empirical sciences	131 (44.6)	163 (55.4)	
Humanities	76 (41.5)	107 (58.5)	
Technical and vocational	74 (37.4)	124 (62.6)	
Work and knowledge	86 (53.4)	75 (46.6)	
Age	17.0 ± 1.8	17.2 ± 1.2	0. 084
Former GPA	16.2 ± 2.2	16.6 ± 2.2	0.001

studies conducted among high school students and adolescents (23, 30). The reported gender difference in the distribution of IA in high schools and universities in Iran can be explained by the fact that although males in Iran generally have more social freedom, friends, and membership in social networks than females due to less parental monitoring and supervision, females experience more freedom in universities with less parental control. Hence, female students can freely allocate their time to the previously restricted activities including spending more time on internet, which subsequently leads to relatively higher prevalence of IA among female university students in Iran.

Based on the results of the current study, the prevalence of IA was low among students in lower grades than the students in higher grades. This finding was contrary to the result of a national level study conducted in Iran

(29). The higher prevalence of IA among the students in lower grades can be attributed to a decrease in the age of using internet among the students in the recent years. Additionally, younger students are naturally curious; thereby, they spend more time in front of a screen than older students. Moreover, the training about logical application of internet and complications resulting from IA does not seem very effective in lower ages, as adolescents in grades 1 and 2 of high school have no plan for future and do not think about many struggles and difficulties in their lives. In other words, with the increase of educational grade in high schools, the adolescents become more aware of their emotions and personal lives and accept their parents' advice on internet usage. More specifically, high school students in Iran plan to study rigorously for the Iranian National University Entrance Exam (Konkour) when they are

Table 3. Logistic Regression Results for the Factors Predicting Internet Addiction Among High School Students in Northwest of Iran

Variables	OR	95 % CI	P value
Gender (Male/Female)	1.91	1.51 - 2.41	< 0.001
Age (higher age) (year)	0.98	0.95 - 1.02	0.539
Education major			
Mathematics and physics	1	-	-
Empirical science	0.94	0.65 - 1.35	0.734
Humanities	0.82	0.55 - 1.23	0.345
Technical and vocational	0.72	0.48 - 1.08	0.112
Work and knowledge	1.43	0.93 - 2.20	0.109
Higher ICS score	0.97	0.96 - 0.98	< 0.001
Former GPA (higher score)	0.98	0.92 - 1.05	0.568

at grade 11th and 12th and, thus, spend less time on computer or other devices connected to the internet.

A previous study in Iran (31) found a negative association between ICS and IA. In fact, adolescents with communication problems are more unsociable (23) and like privacy and spending many hours surfing the internet. Therefore, IA could be due to behavioral disorders in adolescent and, thus, requires further investigation. Besides, individuals with low ICS are more anxious and consequently have more IA (31). Some studies already discussed the positive correlation between mental health and negligence. There was also a positive association between mental health and excessive use of internet. Students with such personalities are characterized as being dependent, shy, depressed with low self-esteem have low ICS, which in turn, increase their potential for IA (32, 33). Unfortunately, parents and adolescents are not aware of physiological disorders that lead to IA and try to solve IA without taking a holistic view of the issue. It seems that the introvert individuals have a lower ICS and could not communicate with extrovert individuals. Most of them follow each other in idiographic space and eventually spend a lot time on surfing the internet. Most of the activities in the internet may lead to dopamine release in the nucleus accumbens (NAcc), which is thought to be an important neurochemical event in the development of addiction. People with no self-esteem are introvert and have a lower ICS. They are more susceptible becoming addicted to the internet as they are more likely to use alcohol and drugs (34).

The current study had several limitations. First, although the cross sectional nature of the study provided evidence of association between the predicting variables and IA, it could not establish temporality between the predicting variables and IA, precluding causal inference. Second,

in spite of satisfactory methodology and sampling design method, the current study findings should not be generalized to all high school students in Iran because the sample was derived from high school students in Tabriz, a major city in the Northwest of Iran.

5.1. Conclusion

Overall, the prevalence of IA among adolescents in the Northwest of Iran was high. Males were more at risk of IA than females. Improvements of ICS may prevent internet addiction in adolescents. It seems that collaboration between parents, teachers, and authorities of high schools to warn and change the students' attitude towards their lives, especially at the beginning of high school, could more effectively address the emerging phenomenon of IA.

Acknowledgments

Footnotes

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